

REMARKS

STATUS OF CLAIMS

Claims 1, 7, 10, 40, 42, 45, 50, 52, 55, 60, 61, 63, 64, 66, and 67 have been amended.

No claims have been cancelled, added, or withdrawn herein. Note that Claims 3-6, 9, 13, 14, 16-39, 44, 48, 54, 58, were previously cancelled in prior amendments.

Claims 1, 2, 7, 8, 10-12, 15, 40-43, 45-47, 49-53, 55-57, and 59-68 are currently pending in the application.

SUMMARY OF THE REJECTIONS/OBJECTIONS

Claim 7 has been objected to because of an informality. Claims 7 and 10 have been rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. Claims 1-2, 7-10, 14-15, 40-45, 48-55, and 58-59 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent Number 6,421,711 issued to Blumenau et al. ("*Blumenau*"). Claims 11-12, 46-47, and 56-57 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over *Blumenau* in view of U.S. Patent Number 6,620,109 issued to Ofer et al. ("*Ofer*"). The rejections are respectfully traversed.

RESPONSE TO THE REJECTIONS NOT BASED ON THE PRIOR ART

A. THE INFORMALITY OBJECTION TO CLAIM 7

The Final Office Action states that "Claim 7 has been objected to because of the following informalities: The 'one or storage units' is suggested to be replaced with 'one or more storage units.' Appropriate correction is required." As suggested by the Final Office Action, Claim 2 has been amended to read "one or more storage units."

In addition, because Claims 42 and 52 include features that are similar to Claim 7, similar changes have been made to Claims 42 and 52.

The Applicant respectfully submits that the amendments to Claims 7, 42, and 52 traverse the objection to Claim 7.

B. THE INDEFINITENESS REJECTION OF CLAIMS 7 AND 10

Claims 7 and 10 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Final Office Action states that the “term ‘logical unit numbers (LUNs)’ [as in Claim 7] is inconsistent with ‘logical units (LUNs)’ in the claims [as in Claim 10] and as such, the term LUNs is indefinite.” Claim 7 has been amended to remove the parenthetical “(LUNs)” following the reference to “logical unit numbers” along with replacing subsequent instances of the abbreviation “LUNs” with the term “logical unit numbers.” Also, Claim 10 has been amended to remove the parenthetical “(LUNs)” following the reference to “logical units.” Thus, as a result of the amendment to Claims 7 and 10, the term “LUNs” in the claims has been removed to avoid any potential for confusion, and any instance of the term “LUNs” is replaced with “logical unit numbers” as originally intended.

In addition, because Claims 42 and 52 along with Claims 45 and 55 include features that are similar to Claims 7 and 10, similar changes have been made to Claims 42, 45, 52, and 55. Also, consistent with these changes, Claims 61, 64, and 67 have been amended to remove the parenthetical “(LUNs)” and to replace “LUNs” with “logical unit numbers.”

The Applicant respectfully submits that the amendments to Claims 7, 10, 42, 45, 52, 55, 61, 64, and 67 traverses the rejections of Claims 7 and 10 under 35 U.S.C. § 112, second paragraph.

RESPONSE TO THE REJECTIONS BASED ON THE PRIOR ART

A. CLAIM 1

(1) INTRODUCTION TO CLAIM 1

As amended above, Claim 1 features:

“A computer-implemented method of allocating storage to a *host processor*, comprising:
a *control processor* receiving a request to allocate storage to the *host processor*; and
the *control processor* associating one or more logical units from among one or more
storage units to the host processor by:

the ***control processor*** configuring a gateway device to map the one or more logical units to the host processor;
the ***control processor*** configuring the one or more storage units to give the host processor access to the one or more logical units;
wherein the *host processor* does **not know** which one or more logical units are associated with the *host processor*;
wherein the ***control processor*** is **a different device than** the ***gateway device***, the *host processor*, and the *one or more storage units*; and
wherein the ***gateway device*** is **a different device than** the ***control processor***, the *host processor*, and the *one or more storage units*.” (Emphasis added.)

Thus, Claim 1 features two changes – (1) that the host processor does “**not know**” which logical units are associated with the host processor and (2) that both the control processor and the gateway device are “**a different device than**” each other and from both the host processor and the one or more storage units. As a result, the approach of Claim 1 for associating storage with the host processor features that the host processor does not know which logical units are associated with the host processor and that both the control processor and the gateway device are different devices than each other as well as the host processor for which storage from the one or more storage units is being allocated. Thus, the ***capability of associating the storage*** from the storage units with the host processor ***is facilitated without the host processor knowing which logical units are associated with the host processor***. In addition, the control processor and gateway device ***are different devices*** from each other and the host processor and storage units.

(2) SUPPORT FOR AMENDMENTS TO CLAIM 1

Note that the amendment to Claim 1 to replace “determine” with “know” effectively incorporates the previous feature of Claim 60 prior to the above amendments (and note that Claim 60 is further amended above, as discussed later herein). Also note that the amendment to Claim 1 to include that “the control processor is different device than the gateway device, the host processor, and the one or more storage units” and that the gateway device **is different device than** the control processor, the host processor, and the one or more storage units”

incorporate features that are similar to, but not the same as, were previously added via the amendment accompanying the first filed RCE for this application (e.g., that the control process and the gateway devices were *separate from* each other, the host processor and the one or more storage units), although those features were subsequently removed by a later amendment.

As explained in previous amendments, the changes to Claim 1 are fully supported by the specification, and no new matter is added. For example, the Application explains with reference to Figure 3 that the virtual storage layer 310 provides “storage virtualization from the perspective of hosts 302A...**Each such host can obtain storage** through virtual storage layer 310 **without** determining or **knowing** which specific storage unit 304A, 304B, 304N, etc., is provide the storage, and **without** determining or **knowing which LUN, block, volume, concatenated, or other sub-unit of a storage unit actually contains data...**” that is used by the host processor. (Application, page 24, lines 20-24; Figure 3.)

As another example, FIGs. 3A, 3B, and 3C all illustrate that control processors 312 and 320A-320N are *different devices* than hosts 302A-302N, 302D, storage gateway 306, storage units 304A-304N, and disk arrays 304C, 304D. As yet another example, FIGs. 3A and 3B both illustrate that storage gateway 306 is a *different device* than hosts 302A-302N, control processors 312 and 320A-320C, storage units 304A-304N, and disk array 304D.

(3) ADDITIONAL DISCUSSION OF WHY THE HOST PROCESSOR DOES NOT KNOW WHICH
LOGICAL UNITS ARE ASSOCIATED WITH THE HOST PROCESSOR

The reason that the host processor does not know about the logical unit(s), or the associated LUN(s), that the host uses is explained in the Application, such as with reference to Figures 2A and 2C. Specifically, the storage area network gateway 210 receives logical unit numbers (LUNs) in block 230, and then the storage area network gateway 210 creates an internal mapping of the gateway’s SCSI ports to the logical unit numbers. As a result, the gateway 210 can properly direct information storage and retrieval requests that arrive on the gateway’s SCSI ports to the correct disk array and logical unit within a subsystem, based on the automatic allocation or assignment of storage to a particular CPU. (Application, page 22, lines 13-20.)

Similarly, the Application later explains that “control processor 312 can command storage gateways 306 and storage area networks 308 to associate a particular LUN of one or more of the storage units 304A, 304B, 304N, etc. with a particular virtual server farm, e.g., to a particular host 302A, 302B, 302N.” (Application, page 24, lines 11-19.) As a result, “virtual storage layer 310 *provides storage virtualization from the perspective of hosts* 302A, etc. Each such host can obtain storage through virtual storage layer 310...**without ... knowing** which LUN...of a storage unit actually contains data” for the hosts. (Application, page 24, lines 20-24.)

The Applicant notes that this additional feature of Claim 1 is in the form of a “negative limitation” and is proper as described in MPEP §2173.05(i). Specifically, that section of the MPEP explains that despite some “older cases [that] were critical of negative limitations because they tended to define the invention in terms of what it was not, rather than pointing out the invention,” the “current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation.” MPEP §2173.05(i) then states that any negative limitation must have basis in the original disclosure, which is the case herein regarding Claim 1 and the other claims with the same or similar features, as noted above in the explanation of support for these claim amendments and newly added claims.

(4) INTRODUCTORY DISCUSSION OF *BLUMENAU*

In contrast to the approach of Claim 1, *Blumenau* discloses an approach for modifying a storage unit referred to as a “cached storage subsystem” to allow for the use of virtual ports by hosts to access storage within the cached storage subsystem. Specifically, the cached storage subsystem 20 includes a storage controller 27 that further includes port adapters 35, 36 that are programmed to provide a plurality of virtual ports and a virtual switch, both of which are defined by software, for routing storage access requests from a physical port of the storage controller to the virtual ports. (Abstract; Figures 1, 21, and 22.) To partition the storage of cached storage subsystem among different hosts, the virtual ports are assigned to each host and the storage volumes associated with each virtual port are made accessible from each host. (Abstract.)

Note that in the approach of *Blumenau*, even with the use of the virtual ports/virtual switch, the host always **must know** the LUNs that the host can access. For example, the **host either reads** the configuration information for the volumes accessible to the host that is stored on either the host or on the storage subsystem. (Col. 31, lines 15-17.) Specifically, *Blumenau* explains that the **host can read** the primary copy of the configuration information in the “gatekeeper” volume in the storage subsystem (Col. 32, lines 18-20), **or the host uses a mapping driver** at power up to send commands to the adapter ports **to obtain the LUN** information. (Col. 32, lines 22-28.) Either way, *Blumenau* clearly states that “the **host must** be programmed **to seek out the LUNs that is can access**” (Col. 32, lines 20-22), which means that **the host** in *Blumenau*’s approach **always knows which LUNs the host can access**.

(5) COMMENTS REGARDING THE FINAL OFFICE ACTION’S CITATIONS FROM *BLUMENAU*

The Applicant appreciates the clarification in the latest Final Office Action as to what elements disclosed in *Blumenau* correspond to the “control processor” and the “gateway device” of the claims. Specifically, the Final Office Action states in the rejection of Claim 1 with reference to Claim 1’s features of “the control processor configuring a gateway device...” that “the *control processor being a part of the gateway device/gatekeeper and configuring itself.*” (Emphasis added.)

As a result, the Applicant understands that the Final Office Action is relying upon the “gatekeeper” of *Blumenau* as corresponding to the “gateway device” of the claims and that the “control processor” of the claims corresponds to a part of *Blumenau*’s “gatekeeper.” Thus, the Applicant understands that the Final Office Action is relying upon the device referred to as the “gatekeeper” in *Blumenau* as corresponding to both the “control processor” and the “gateway device” of the claims.

(6) SUMMARY OF THE DISCUSSION OF THE OFFICE ACTION’S CITATIONS FROM *BLUMENAU*

To summarize the following arguments, the approach of Claim 1 features that “the **host processor does not know which one or more logical units are associated with the host processor,**” whereas in the approach of *Blumenau*, the opposite is true – namely that “the host **must be programmed to seek out the LUNs that is can access.**” (Col. 32, lines 20-22; emphasis added.) In addition, the approach of Claim 1 features that “the control processor is a

different device than the gateway device” and that “the gateway device is a *different device* than...the control processor,” whereas in the approach of Blumenau as interpreted in the Final Office Action, “the *control processor* being a *part of the gateway device/gatekeeper* and *configuring itself*.” (Final Office Action, Rejection of Claim 1, page 4.)

(7) DETAILED DISCUSSION OF THE FINAL OFFICE ACTION’S CITATIONS FROM *BLUMENAU* IN
THE REJECTION OF CLAIM 1 WITH RESPECT TO THE HOST PROCESSOR NOT KNOWING WHICH
LOGICAL UNITS ARE ASSOCIATED WITH THE HOST PROCESSOR

In the rejection of Claim 1 and other claims, the Final Office Action makes repeated citations to Columns 9, 31-34, and Figures 1-4 of *Blumenau*. However, the Applicant has been unable to identify either in those portions or elsewhere of *Blumenau* that the host does not know the logical units that are associated with the host processor, as in Claim 1. Rather, *Blumenau* states exactly the opposite, namely that states “the host **must be programmed to seek out the LUNs that is can access.**” (Col. 32, lines 20-22; emphasis added.)

Specifically, in Columns 31, 32, and the first portion of 33, *Blumenau* describes the “host involvement in volume configuration and mapping.” (Col. 31, lines 7-8.) First, *Blumenau* explains that “the configuration information for the volumes accessible to a host is kept in the storage subsystem and on the host. The host should be able to access the primary copy on the storage subsystem if the host’s local copy is not available.” (Col. 31, lines 19.) For example, “the configuration information is stored in a predefined logical volume, such as a volume accessed at LUN0, that functions as a gatekeeper device.” (Col. 31, lines 23-26.)

Blumenau also explains that even with the use of the “virtual ports” described therein and that are the focus of that reference, the virtual ports are reported to the host along with the LUNS available to the host from each virtual port, both of which are programmed into each of the port adapters that implement the virtual ports. (Col. 32, lines 13-18.) *Blumenau* then explains an alternative in which instead of the hosts determining the LUNs via such routines, the host can read the primary copy of the configuration information stored in the “gatekeeper” volume of the storage subsystem. (Col. 32, lines 18-20.)

Then *Blumenau* states: “***In any case***, the host **must be programmed to seek out the LUNs that it can access**,” either by a mapping driver at startup that includes commands to

obtain the LUN information from the adapter ports or by reading the primary copy of the configuration information in the storage subsystem. (Col. 32, lines 20-31; emphasis added.) Therefore, *Blumenau* not only fails to disclose that “the **host processor does not determine which one or more logical units are associated with the host processor**,” as in the approach of Claim 1, but *Blumenau* expressly teaches away from such a feature by stating that the host must seek out (or determine) the LUNs that the host can access.

The other portions of *Blumenau* mentioned above are consistent with Columns 31 and 32. Specifically in Columns 33 and 34, *Blumenau* explains how the host request logical volumes. (Col. 33, lines 27-28.) In particular, *Blumenau* describes the “mount” and “unmount” commands that are issued by the host controller to the port adapters, and each of these commands the LUNs. (Col. 33, lines 29-52.) The gatekeeper facility then responds to these commands and creates entries for the required mappings, which are reflected in the configuration information stored at the host and on the gatekeeper volume of the storage subsystem, either of which are accessed by the host controller, as described above. (Col. 33, line 53 – Col. 34, line 10.)

Likewise, in Column 9, *Blumenau* describes how the host obtains the LUN information. Specifically, *Blumenau* explains that the mapping of LUNs and logical volumes are “specified by or reported to a host,” such as through a “Report LUNs” command that is typically executed by the operating system of the host at “boot” time. “(Col. 9, lines 18-43.)

(8) DETAILED DISCUSSION OF THE FINAL OFFICE ACTION’S CITATIONS FROM *BLUMENAU* IN THE REJECTION OF CLAIM 60 WITH RESPECT TO THE HOST PROCESSOR NOT KNOWING WHICH LOGICAL UNITS ARE ASSOCIATED WITH THE HOST PROCESSOR

As noted above, the amendment to Claim 1 incorporates a feature previously included in Claim 60 that previously read “wherein the host processor does not know which one or more logical units are associated with the host processor.” Thus, as a result of the above amendments, the Final Office Action’s rejection of Claim 60 is now relevant to Claim 1 as amendment above, and therefore the citations and rejection of Claim 60 are addressed herein.

In the rejection of Claim 60, the Final Office Action states that *Blumenau* discloses “the host processor does not know which one or more logical units are associated with the host processor (at least col. 11 line 57 – col. 12 line 31; restrict volumes seen (“known”) by

any one host.” While the cited portion of *Blumenau* does explain that “it may be desirable to restrict the set of volumes that can be seen by any one host,” (Col. 12, lines 1-2,) the Final Office Action has apparently misread this feature of Claim 1 (e.g., which was previously in Claim 60) because Claim 1 does not feature that the host processor does not know of some logical units. Rather, Claim 1 features that “the host processor does not know **which one or more logical units are associated with the host processor**.” Thus, in Claim 1, the host processor does not know which logical units are associated *with itself*, which is quite different from *Blumenau* explaining that it is desirable to restrict the volumes seen by any one host.

In particular, *Blumenau* expounds upon the statement about it being desirable to restrict the set of volumes seen by any one host as follows:

“Certain ‘private’ volumes should be assigned to each host and other hosts should not be permitted to see or modify the private **volumes of other hosts**. Moreover, the ‘boot’ process for a host is slowed down by searching for and reporting all the volumes to which the host has access. Certain operating systems are limited by the number of devices that they can handle at any given time, and for a host using such an operating system, it is not only desirable but also necessary *to limit the number of volumes that the host can access*.”
(Col. 12, lines 2-11; emphasis added.)

The additional citation to Column 12 merely explains how the volumes seen by any one host can be restricted, such as by using named groups and/or virtual ports. (Col. 12, lines 12-31.)

When this is read in conjunction with the earlier discussed portions of *Blumenau* that clearly state that “the host **must be programmed to seek out the LUNs that it can access**,” (Col. 32, lines 20-31; emphasis added), the discussion of Columns 11 and 12 of *Blumenau* would be clearly understood to mean that a particular host in *Blumenau* must always know which logical units and LUNs that that particular host can access, but that for other volumes of *other hosts*, the particular host need not know of those volumes. Thus, contrary to the assertion in the rejection of Claim 60 of the Final Office Action, the Applicant respectfully submits that this cited disclosure of *Blumenau* does not disclose that “the host processor does not know which one or more logical units are associated with the host processor.” The Applicant also notes that the Final Office Action itself recognizes and acknowledges that the host knows which LUNs it is able to access. (See Response to Arguments, page 14, lines 4-6.)

An additional review of *Blumenau* has failed to identify any other portion of *Blumenau* that discloses that a particular host in *Blumenau*'s approach does not know which logical units or LUNs are associated with that particular host. Furthermore, if there were such a disclosure in *Blumenau*, then such a disclosure would contradict description of how *Blumenau*'s approach works, which requires that "the host **must** be programmed to seek out the LUNs that it can access." (Col. 32, lines 20-31; emphasis added.) Thus, the Applicant respectfully submits that not only does *Blumenau* fail to disclose that "the host processor does not know which one or more logical units are associated with the host processor," but *Blumenau* expressly teaches away from this feature of Claim 1 by stating that "the host **must** be programmed to seek out the LUNs that it can access." (Col. 32, lines 20-31; emphasis added.)

(9) DISCUSSION OF CLAIM 1 FEATURING THAT THE HOST PROCESSOR AND GATEWAY
DEVICE ARE DIFFERENT DEVICES

In the approach of Claim 1, "the host processor is a different device than the gateway device" and "the gateway device is a different device than...the host processor." However, in the rejection of Claim 1, the Final Office Action cites on page 4 with respect to the feature of "the control processor configuring a gateway device to map the one or more logical units to the host processor" to "at least col. 32 line 13 – col. 33 line 17" of *Blumenau*, explaining that "the control processor being a part of the gateway device/gatekeeper [of *Blumenau*] and configuring itself." Thus, the rejection of Claim 1 is based on the *Blumenau*'s gatekeeper corresponding to both "control processor" and the "gateway device" of Claim 1, or in other words, that the control processor and the gateway device of Claim 1 are the **same** device. As noted above, the Applicant appreciates this clarification in the Final Office Action, since as noted in previous responses, it has not been clear to the Applicant which portions of *Blumenau*'s disclosure correspond to the features of the claims.

Nevertheless, in the approach of Claim 1 as amended above, the control processor and the gateway device are different devices than each other. As a result, the disclosure of *Blumenau* cited above that the Final Office Action has interpreted as the control processor being a part of the gatekeeper and configuring itself is different than the approach of Claim 1

that features “the control processor configuring a gateway device to map the one or more logical units to the host processor” and that the control processor and the gateway device are different devices.

(10) DISCUSSION OF CLAIM 1 AND *Ofer*

Although not relied upon in the rejection of Claim 1 or any of the other independent claims, nor most of the dependent claims, the Applicant is including this new subsection in this reply in response to the issue raised in the Office Action mailed on June 29, 2006, so as to preclude another similar Office Action in the future.

In contrast to the approach of Claim 1, *Ofer* discloses an approach for providing very large logical volumes in a storage system that span several physical volumes. (*Ofer*, Title, Abstract.) In particular, *Ofer* describes concatenating together request queues in a host controller to produce the larger logical volume that appears to the host as a single addressable unit. (*Ofer*, Abstract.) When I/O requests to the large logical volume are received, the host controller analyzes the I/O requests to determine which logical devices within the large logical volume are actually needed to service the request, and then the host controller makes the appropriate queue entries for those identified logical devices. (*Ofer*, Abstract.) Thus, as *Ofer* describes, this “allows the disk controllers and memory operate without modification,” and as a result, only the “host controllers” of the storage system need be modified. (*Ofer*, Abstract.)

Thus, *Ofer* is only addresses to the concatenation of individual logical volumes to create a large/larger logical volume, which *Ofer* refers to as a “Meta Device.” (*Ofer*, Abstract.) As a result, *Ofer* is silent as to “host processors” as in the approach of Claim 1, little less the use of a gateway device that is configured to map logical units to the host processor, little less that the host processor does not know which logical units are associated with the host processor or that the control processor and the gateway device are different devices, as in the approach of Claim 1.

(11) CONCLUSION OF DISCUSSION OF CLAIM 1 AND *BLUMENAU* AND *Ofer*

Because both *Blumenau* and *Ofer*, either alone or in combination, fail to disclose, teach, suggest, or in any way render obvious that “the *host processor* does not know *which one or more logical units are associated with the host processor*,” and furthermore because

Blumenau expressly teaches away from such a feature when *Blumenau* states “the host **must be programmed to seek out the LUNs that is can access**” (Col. 32, lines 20-22; emphasis added), the Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

In addition, because both *Blumenau* and *Ofer*, either alone or in combination, fail to disclose, teach, suggest, or in any way render obvious that “the control processor is a *different device* than the gateway device” and that “ the gateway device is a *different device* than...the control processor,” the Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

B. CLAIMS 40 AND 50

Claims 40 and 50 contain features that are the same as those described above with respect to Claim 1, and in particular both Claims 40 and 50 feature “the *host processor does not know which one or more logical units are associated with the host processor*,” that “the control processor is a *different device* than the gateway device,” and that “ the gateway device is a *different device* than...the control processor,” which is the same as in Claim 1. Therefore, based on at least the reasons stated above with respect to Claim 1, the Applicant respectfully submits that Claims 40 and 50 are allowable over the art of record and are in condition for allowance.

C. CLAIMS 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, AND 59-68

Claims 2, 7, 8, 10-12, 15 and 60-62 are dependent upon Claim 1, Claims 41-43, 45-47, 49, and 63-65 are dependent upon Claim 40, and Claims 51-53, 55-57, 59, and 66-68 are dependent upon Claim 50, and thus include each and every feature of the corresponding independent claims. Therefore, the Applicant respectfully submits that each of Claims 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, and 59-68 is allowable for the reasons given above for Claims 1, 40, and 50.

In addition, each of Claims 2, 7, 8, 10-12, 15 and 60-62 are dependent upon Claim 1, Claims 41-43, 45-47, 49, and 63-65 introduces one or more additional limitations that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those

limitations is not included at this time, with the exception of a small number of dependent claims that are addressed below. Therefore, it is respectfully submitted that Claims 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, and 59-68 are allowable for the reasons given above with respect to Claims 1, 40, and 50.

D. CLAIMS 60, 63, AND 66

(1) SUPPORT OF AMENDMENTS TO CLAIMS 60, 63, AND 66

Claims 60, 63, and 66, as amended above, now feature that “the host processor does **not identify** which one or more logical units are associated with the host processor.” The amendments to Claims 60, 63, and 66 are fully supported by the specification, and no new matter is added.

For example, the Application explains with reference to Figure 3 that the virtual storage layer 310 provides “storage virtualization from the perspective of hosts 302A... **Each such host can obtain storage** through virtual storage layer 310 **without** determining or knowing which specific storage unit 304A, 304B, 304N, etc., is provide the storage, and **without** determining or knowing *which LUN, block, volume, concatenated, or other sub-unit of a storage unit actually contains data...*” that is used by the host processor. (Application, page 24, lines 20-24; Figure 3.)

As another example, the Application later explains that “control processor 312 can command storage gateways 306 and storage area networks 308 to associate a particular LUN of one or more of the storage units 304A, 304B, 304N, etc. with a particular virtual server farm, e.g., to a particular host 302A, 302B, 302N.” (Application, page 24, lines 11-19.) As a result, “virtual storage layer 310 *provides storage virtualization from the perspective of hosts* 302A, etc. Each such host can obtain storage through virtual storage layer 310... **without** determining or knowing which LUN... of a storage unit actually contains data” for the hosts. (Application, page 24, lines 20-24.)

The Applicant notes that the particular wording used in Claims 60, 63, and 66, namely that the host processor does not “identify” the one or more logical units that are associated with the host processor does not appear in the cited portions of the specification. However, given the Final Office Action’s discussion of “determining” versus “knowing” in the

Response to Arguments section, it appears that the Final Office Action is based on interpreting “determining” as the assignment of logical units and the corresponding LUNs to a host because the Final Office Action notes correctly that the host in *Blumenau*’s approach subsequently knows which LUNs that host is able to access. This is consistent with the portions of *Blumenau* that the Applicant has repeatedly emphasized above, namely that the “the host **must be programmed to seek out the LUNs that it can access**” (Col. 32, lines 20-22; emphasis added).

However, as can be seen from the cited portions of the specification, the discussion of the host processor “not determining or knowing which LUN, block, volume, concatenated, or other sub-unit of a storage unit actually contains data” means “not determining” in the sense that host processor does not seek out or identify which logical unit or LUN has been associated with the host processor. For example, in FIG. 2C of the Application, the LUNs are provided to the storage area network gateway (block 230), and then a mapping is created in the SAN gateway of SCSI port to LUN(s) (block 240). As a result, the host processor is insulated from the knowledge of which LUNs are associated with the host processor, as that mapping of LUNs to host processor is knowledge that is known by the gateway device, not the host processor. By explaining that the host processor does not determine or know which LUNs are associated with the host processor, the Application means that the host processor does not subsequently identify which LUNs are associated with the host processor, which thus “virtualizes” the storage system from the viewpoint of the host processor.

Thus, the Applicant, in amending Claims 60, 63, and 66 to feature that the host does not “identify” the logical units that are associated with the host, even given that those logical units must be associated with the host by some device in some way, intends to address the Final Office Action’s interpretation of “determining” to mean the mapping of hosts to logical units. Of course, in the approach of the claims of course, logical units are still mapped to host processors, but that information is held by the gateway device and yet is still not subsequently identified by the host processor in the approach of Claims 60, 63, and 66. This is in contrast to the approach of *Blumenau* in which such a mapping is also not determined by the host, yet nevertheless “the host **must be programmed to seek out [e.g., identify] the LUNs that it can access**” (Col. 32, lines 20-22; emphasis added).

(2) THE FINAL OFFICE ACTION'S CITATIONS FROM *BLUMENAU* WITH RESPECT TO
CLAIMS 60, 63, AND 66

Claims 60, 63, and 66 each feature that “the host processor does not identify which one or more logical units are associated with the host processor,” as compared to Claims 1, 40, and 50 that each feature that “the host processor does not know which one or more logical units are associated with the host processor.” Thus, in Claims 60, 63, and 66, not only does the host processor does not know the logical units that are associated with the host processor (e.g., that another entity tracks that knowledge), the host processor also does not “identify” which logical units are associated with the host processor (assuming that the logical units are determined by an entity other than the host processor).

The same explanation for why *Blumenau* does not disclose that the host processor does not know the logical units that are associated with the host processor also explains why *Blumenau* does not disclose that the host processor identify the logical units or the LUNs that are associated with the host processor.

CONCLUSION

The Applicant believes that all issues raised in the Final Office Action have been addressed and that allowance of the pending claims is appropriate. Entry of the amendments and further examination on the merits are respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

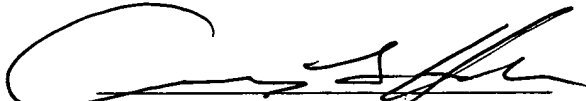
For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

To the extent necessary to make this reply timely filed, the Applicant petitions for an extension of time under 37 C.F.R. § 1.136.

If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP



Craig G. Holmes
Reg. No. 44,770

Date: March 1, 2007

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Hon. Commissioner for Patents, Mail Stop RCE, P.O. Box 1450, Alexandria, VA 22313-1450.

on March 1, 2007 by Tracy Reynolds
Tracy Reynolds